in them free parts. It sometimes happens that they become detached from the collodion and float away. In this case the section can be collodionized as was first suggested by Dr. Marks. This is done by coating the tissue before each section is cut with a thin coat of 1 % collodion, using a camel's hair brush for the purpose. Then draw the knife across the tissue very slowly, keeping alcohol dripping on it while the section is being cut. In this way beautiful longisections of large compound pistils can be obtained in which the sections of ovules, though not held in place by the placenta, will, nevertheless, remain in their proper position and perfect serial sections of each ovule obtained.

Care should be taken that none of the sections be cut before collodionization, for although it may not always be necessary to keep the parts in place, yet it is always a safeguard against their displacement. The method as given is found to work admirably on very delicate meristematic tissue. No heat being required the most delicate of tissue will not shrink. Then, too, the shortness of the method commends it to general use. I find that 2 days or even 36 hours is sufficient and is even better than a longer time to go through the whole operation of hardening, infiltrating and sectioning nearly all kinds of plant tissue. The material may apparently be left in the thick collodion indefinitely without deteriorating. The sections after being cut can be handled with a camel's hair brush without danger of breaking. By a little experience one will find that the method as given will enable him to bring to his hand material with which to pursue with certainty any investigation in histological botany.

Cornell University.

A biographical sketch of J. B. Ellis.

F. W. ANDERSON.

(WITH PORTRAIT.[1])

The subject of the present sketch was born at Potsdam, N. Y., January 21, 1829. He evinced a remarkable fondness for study at an early age, and the time not spent at school or at work on his father's farm was devoted to reading. At the age of sixteen he taught the winter school at Stockholm, St. Lawrence county. Here the lad received for his services ten dollars a month and "boarded around." Five of the ten dollars was paid in cash, the other five was

[1] By mistake of binder the portrait of Mr. Ellis was bound with the October GAZETTE.

to be paid in grain. It was just twenty years afterward when the last of the grain was turned over to him. Having completed his academical course he entered Union College at Schenectady, N. Y., in the fall of 1849. By the end of the fall term his funds were exhausted and he had to seek employment for the winter. So, in company with A. B. Smith, now a successful lawyer of Poughkeepsie, N. Y., he started afoot into Saratoga county to find a school to teach. After walking for some miles they came to where the road forked in the midst of a dense pine wood. Not knowing which fork to take a stick was set up on end and allowed to fall. It fell towards the right-hand fork, which the young men followed and soon came to the village of Charlton. Here Mr. Ellis got a school while Smith went on to Galway, the next village, and fortunately got the school there. In June, 1851, Mr. Ellis graduated from Union College with the degree of A. B. (since advanced to A. M.), and went to Germantown, Pennsylvania, into a select school with the Rev. D. Washburne. He had studied botany a little at college but it was here that he commenced to take an active interest in phanerogamic botany, little dreaming what the outcome would be. The earliest plants he remembers collecting were Liparis liliifolia and Lygodium palmatum. In November, 1851, he severed his connection with the school and entered the Albany Academy as classical tutor, remaining one year. This position was better suited to his taste for he had decided to become a professional teacher of classics. George H. Cook, recently deceased, state geologist of New Jersey, was principal of the academy. The evenings were spent making blow-pipe analyses of minerals with G. W. Taylor, a fellow tutor. The following year he and Taylor went into a select school together for three months, but as it did not pay the school was broken up and Mr. Ellis returned to Potsdam. While with Taylor he saw by chance a notice of Ravenel's Fungi Caroliniani exsiccati, the first thing of the kind ever issued in America. While at college he had frequently noticed the agarics, but not knowing where to get books or information concerning fungi let them alone. But upon seeing the notice of Ravenel's collection he wrote to him and then commenced a correspondence (in 1857), interrupted only by the war, which lasted till Ravenel's death. He continued collecting phanerogams until 1870, at the same time giving gradually more and more attention to fungi. In 1870 he sold his phanerogamic collection, containing about 1,000 species, to St. Lawrence University, Canton, N. Y.

In May, 1853, he moved to Poughkeepsie, entering a Mr. Bartlett's boarding school as classical teacher, and stayed two years. While there he and Prof. Buckhout, now of State College, Centre county, Penn., collected plants on Saturdays, and, said he, "on Sundays, too, if we could steal away, for Mr. Bartlett was very pious." In February, 1855, in company with his sister, Mrs. L. B. Doud, late of Plattsmouth, Neb., he left Poughkeepsie for Charleston, S. C., with the intention of teaching school there. He called on one of the professors in the South Carolina College to seek information on the subject. Said he: "I told him that I had come South to teach and make a home there. He at once asked me whence I came, and when I answered from New York, he replied, while slowly swinging in his revolving office chair: 'Well, the state of feeling between the North and South is such that I doubt very much whether you will succeed.'" And he didn't. From Charleston he and his sister went to Alexander, near Augusta, Ga. Here he succeeded in obtaining a position in an academy and taught one term. One morning he went to the class-room and found a huge living snake writhing about in the big open fire-place suspended by a stout string tied tightly about its middle and hanging from a hook in the chimney, where the boys had placed it for fun. Upon my once inquiring whether any incident of special interest had occured while he was there, he replied: "No; the most interesting incident was to get away, that is very distinct, even now." He returned to Potsdam, and on the 19th of April, 1856, an event took place which made it possible for him to do the enormous and valuable work he has since done for American mycology. This was his marriage to Miss Arvilla J. Bacon, who has been a faithful partner in all the vicissitudes of life, and a constant and painstaking assistant in his mycological work for the past thirty-four years. They have one daughter, who is one of New York's most popular professional musicians.

In the fall of 1856 he became principal of Canton Academy. In 1863, he, with Mrs. Ellis, went into one of the public schools in Potsdam village. He was engaged there until September, 1864, when he entered the United States Navy at Brooklyn, N. Y., and spent the winter of 1864–5 on the United States steam frigate Susquehannah of the North Atlantic Blockading Squadron. He was present at the bombardment of Fort Fisher three days in December, 1864, and three days in January, 1865, when the fort was taken. While on the war ship he became acquainted with a man

named Hale from New Jersey, who told him of the good climate in the vicinity of Newfield. At the close of the war, in the spring of 1865, Mr. Ellis once more returned to his native town (which he has but once visited since) and removed his worldly possessions to Newfield, N. J., where he has continuously lived, twenty-five years having been spent under his present roof. Since living here he has been engaged in a variety of pursuits.

At last, in 1878, he dropped every thing else and commenced to devote his whole time to fungi, desiring to disseminate more widely a knowledge of North American fungi and to arouse home botanists if possible from their apathetic indifference towards these plants. He decided to begin in a modest way by issuing ten sets of New Jersey fungi under the title of "Fungi Nova-Cæsarienses." He put up ten centuries on sheets of paper in boxes. Of the two sets sold one went to Dr. Farlow the other to Mr. Isaac C. Martindale. About this time Mr. Ellis went to see the latter gentleman, who asked, "Why not call it N. A. F."? Mr. Ellis seeing the greater appropriateness and scope of such a title recalled the two sets and concluded to get out a series of centuries in bound volumes, entitled North American Fungi. At that time he was so pressed for means that he had not money enough to get the books made for the first two centuries. Thereupon, Prof. Farlow, who favored the scheme, had the books made in Boston and advanced them to Mr. Ellis, who paid for them as soon as he was able. The centuries took well from the start, and from thirty-five sets to begin with the demand rapidly increased up to fifty-three sets, which number of copies has been issued regularly for the past five or six years. Altogether twenty-five centuries have been issued, or, about 1,200 separate volumes have been made, filled with specimens and sold. Truly "N. A. F." has become, I might say, a household phrase with the cryptogamic botanists of this country and Europe. In all this great undertaking, as well as in others to be mentioned in an article on Mr. Ellis' great herbarium, the cheerful interest and practical helpfulness of Mrs. Ellis has been constantly apparent. She has made and bound all the books except the first sixty which Dr. Farlow kindly advanced for his friend at the beginning. Nearly all of the specimens have been cleaned, sorted, put into neat pockets, labeled and fastened into the books by her own hands. Mr. Ellis himself says, that owing to his great correspondence and the enormously burdensome quantity of material constantly being sent to him for deter-

mination and comparison, he would not have been able to get out the N. A. F. without her valuable aid.

From 1876 to 1879, not having at that time the books and exsiccati collections necessary for independent work, many specimens were sent to Dr. M. C. Cooke who determined and published them in *Grevillea* Under the circumstances then existing this course seemed necessary though it called out some adverse criticism at the time.

Since 1880 Mr. Ellis has been associated with Mr. Benjamin M. Everhart, who has freely placed at his friend's disposal his splendid botanical library and extensive mycological collections, and to whose aid and counsel Mr. Ellis feels greatly indebted.

In July, 1878, Mr. Ellis was elected a corresponding member of the Academy of Natural Sciences of Philadelphia. In August, 1882, he was elected a corresponding member of the Cryptogamic Society of Scotland, and in December of the same year was elected corresponding member of Die Kaiserlich-Königliche Zoologisch-Botanische Gesellschaft in Wien.

Mr. Ellis leads a quiet and retired life well suited to his studious, sensitive nature. Although he moved about considerably in his younger days he was always fond of home, as can be plainly seen from his invariable return to Potsdam, his native town, after every venture into the outer world. Too much excitement of any kind affects him painfully even now. With considerable quiet humor he tells how that when he was teaching in Mr. Bartlett's school he determined on three different occasions to go down on the boat to New York and stay there several days to "do the city," and each time returned home on the first train he could get, suffering with a violent headache caused by the excitement of the trip and the noisy bustle of the city. His fellow-botanists feel his influence and recognize the value of his work, but wonder why they never see his kindly face at any of the botanical meetings of the country. It is simply because his health at all times precarious, demands constant quietude coupled with strict simplicity and regularity in his daily life. A thorough scholar and quite a linguist, he is perfectly familiar with Latin, Greek, German and French and has also a good practical knowledge of Polish, Swedish, Italian and Spanish.

What Asa Gray was to American phanerogamic botany, Job B. Ellis is to American mycology. He is now looking forward with pleasant anticipation to the publication of a

manual of North American Pyrenomycetes which, when it appears, will undoubtedly give a great impetus to the study of fungi in this country. Long may he remain in our midst working with and for us! Despite a checkered and toilsome life in past years, often in financial straits, and always burdened with delicate health, he has probably done more than any other man in America to advance the knowledge of our native fungi and to stimulate the ardor of every student of mycology.

New York City.

Notes on the flora of the Lake Superior Region. III.

II. Vermilion Lake, Minnesota.

E. J. HILL.

From the copper region of Keweenaw Peninsula I went to Vermilion Lake, the center of the iron mining of Minnesota. The passage by boat from Houghton to Duluth affords some fine views of scenery along the south shore of Lake Superior, since, for one day at least, daylight will be had. Of these, the most noteworthy are Porcupine Mountain, near Ontonagon, and Ashland and Bayfield with their beautiful bay and the outlying Apostle Islands, and the traveler will not soon forget his first sight of Duluth from the water below, or the climb to the hills above to see the city from another outlook, a terraced city with streets rising one above the other on the rocky slope, making it possible to get a birdseye view of the place from a single spot, as it spreads like a map before you. From here one goes by the Duluth and Iron Range Railroad, a ride of a hundred miles, to Tower, on Vermilion Lake. For a third of the way the road runs along the shore of Lake Superior, though the sight of the lake is cut off a good part of the time by intervening woods, as the road keeps near the foot of the hills which come down rather steeply, leaving a strip of more level land between them and the beach. The trees are mostly of the hardwood kinds, interspersed with conifers. On reaching Two Harbors, the shipping point of the iron of the adjoining region, the road turns abruptly away from the lake, and for the rest of the way is little more than a lane cut through the woods. Scarcely a settlement is seen till within a few miles of Tower, the house or two, when a station occurs, being for the employees of the road.